Public Page
Integrity Management for Wrinklebends and Buckles #132
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In this period, our investigation is focused on (a) develop numerical results characterizing the interaction between the pressure, constraint and wrinkle size for localized corrosion defects on the fatigue life for X42 pipeline steel, (b) evaluate the effect of hot forming on the mechanical and fatigue properties of materials, and (c) quantify the effects of hot versus cold formed wrinkles on the wrinkle shape and the fatigue damage. The results indicated that pressure and wrinkle size are primary parameters to affect the integrity of the wrinklebends, and the constraint effect induced by the corrosion defects at the wrinklebend is limited on wrinklebend integrity except for significant constraint loss due to very large corrosion defects generated on the wrinkles. The results also showed that temperature has different influences on the mechanical and fatigue properties of pipeline steels. As temperature increases, the yield strength, and the ultimate tensile strength decrease gradually. The material rigidness or the elastic modulus reduces at the same time. Accordingly, the hot-formed wrinkle sizes decreased and the fatigue damage increased significantly compared to the cold wrinklebends at the same loading and boundary conditions. Therefore, the cold forming process is suggested to form the wrinkles.